

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) Method for ~~increasing process stability, especially absolute gage precision and plant safety, in the hot rolling of steel or nonferrous materials with small degrees of deformation (ϕ) or small reductions, comprising the steps of:~~ calculating a set rolling force (F_w) and a given adjustment position (s) by taking into account a the yield point at elevated temperature (R_e); and determining ~~when calculating the set rolling force (F_w) and the given adjustment position (s), wherein the following relation is used to determine the yield point at elevated temperature (R_e) as a function of the deformation temperature (T) and/or deformation rate (ϕp), which is then integrated in the function of the flow stress ($k_{f,R}$) for determining the set rolling force (F_w), using the relation~~

$$R_e = a + e^{b1+b2 \cdot T} \cdot]p^c \quad (2)$$

by expanding a multiplicative flow curve relation by the yield point at elevated temperature (R_e) as a function of the deformation temperature (T) and deformation rate (ϕp) according to the formula

$$k_{f,R} = a + e^{b1+b2 \cdot T} \cdot]p^c \cdot k_{f0} \cdot A_1 \cdot e^{m1 \cdot T} \cdot A_2 \cdot]^{m2} \cdot A_3 \cdot]p^{m3} \quad (3)$$

where

R_e = yield point at elevated temperature

T = deformation temperature

ϕp = deformation rate

$a, ; b_i; c$ = coefficients.

2. (Currently Amended) Method in accordance with Claim 1, wherein the flow stress ($k_{f,R}$) is integrated in a ~~the~~ conventional rolling force equation for determining the set rolling force (F_w) for ~~the~~ automatic gage control as well as for computational models and automatic control processes according to the following equation

$$F_w = Q_p \cdot k_{f,R} \cdot B \cdot (R_w \cdot (h_0 - h_1))^{1/2} \quad (4)$$

where

F_w = set rolling force

Q_p = function for taking into account the roll gap geometry and friction conditions

$k_{f,R}$ = flow stress, taking into account the yield point

B = rolling stock width

R_w = roll radius

h_0 = thickness before the pass

h_1 = thickness after the pass.

3. (Previously presented) Method in accordance with Claim 1, wherein a material modulus (C_M) is calculated on the basis of the set rolling force (F_W), taking into account the yield point at elevated temperature (R_e) as a function of the deformation temperature (T) and deformation rate (ϕp) for degrees of deformation smaller than a material-specific limiting degree of deformation (ϕ_G), according to the formula

$$C_M = (F_W - F_m) / dh_1 \quad (5)$$

where

C_M = material modulus
 F_W = set rolling force
 F_m = measured rolling force
 dh_1 = change in the runout thickness.

4. (Currently Amended) Method in accordance with Claim 3, wherein a the conventional gage meter equation is expanded into the form

$$ds_{AGC} = (1 + C_M/C_G) dh_1 = (1 + C_M/C_G) \cdot ((F_W - F_m) / C_G + s - s_{soll}) \quad (6)$$

where

ds_{AGC} = change in the roll gap setting
 C_M = material modulus
 C_G = rolling stand modulus

dh_1 = change in the runout thickness

F_w = set rolling force

F_m = measured rolling force

S = adjustment of the roll gap

S_{soll} = desired adjustment of the roll gap.